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Introductory Lecture

On Jenner & Vaccination

1870-3-28

Introductory
to the 5th Course of the Aux. Faculty of Medicine, Univ. of Pa.
March 28th 1870.

Our presence here to day, Gentlemen, ~~is the occasion~~ invites reminiscences of the past. This University, as you no doubt well know, has a history; which has been written, and well written, by one of the most honored members of its Faculty. More than 50 years ago, as we read in Dr Carson's excellent historical volume, in 1816, the Trustees of the University created in it first Faculty of Natural Science. The appointments therein were as follows:

Dr. W. P. C. Barton, Professor of Botany.
Dr. Chas. Caldwell, of Natural History.
Dr. Thos. Cooper, of Mineralogy & Chemistry.
Dr. Thos. T. Hewson, of Comparative Anatomy.

A Professorship of Natural Philosophy was at the same time transferred from its place, previously held, in the Medical Department, to one in this Faculty of Natural Science; but it does not appear to have been filled at that period.

We observe, then, that the idea recently made fully practicable, by the liberality of one whom, it appears to me, more than all others this Uni-

-versity, and the medical Profession of Philadel-
-phia, ought to delight to honor, is most fully
sanctioned by an earlier conception, and par-
-tial realization. Much sooner, still, the
direct connection between natural science and
Medicine was, here, recognized. One of the
first members of the Faculty of the institution, in the initial organiza-
-tion, Dr Adam Kuhn, delivered a full course of
lectures on Botany in 1768. Mr William Bar-
-tram was elected Professor of Botany in 1782. Dr
Benjamin Smith Barton delivered twenty-four courses
upon botany, in successive summers, while he was Profes-
-sor of Materia Medica, and afterwards, for a short time,
of Practice. Dr Barton may be remembered as, with the
exception of Dr Kuhn, the first public teacher of Natural
Science in the cis-Atlantic world. His influence, in
this department of study, was great. In Dr Carson's
words, "He created a taste for these pursuits,
that has never been lost in this community;
and which has ultimately developed itself in per-
-manent establishments for the cultivation of the
Natural sciences." Besides Dr W. P. C. Barton

and ~~Drs Bigelow and Baldwin~~ others, the science of botany owes much to him as the preceptor of Dr. William Darlington; so long known as the most popular, if not the most celebrated, botanist of our state. It is not needful for me to add, that this science has, since that time, been continuously and ably represented in this University, - in the teachings of Dr George B. Wood, who belongs to our present as well as to the past, and in those of Professor Carson, and of Professor H.C. Wood, of the faculty on whose behalf we are here met to-day. That such instructions, and the labors and publications of such men, with those of Wistar, Rodman and others of our profession in the allied departments, contributed as much as any influences whatever to make this city a scientific centre, is not to be doubted.

But, the days which I have referred to in this retrospect were those of the golden age of Medical ability in Philadelphia; the days of Rush, Physick, Wistar, Dorsey, the Bartons, Dewees and others, who made for this university and for the city that reputation which constituted it the medical metropolis of the country; a reputation, gentlemen, which we may wish, - and I would venture to call on you, as members with us of the University to determine, shall never suffer decline.

In that favored period, then, the idea was, as we have seen, fully accepted, that the education of every physician ought to be liberally scientific. But this was not then at all a new idea. It is even as old as Hippocrates; as Medicine itself. The 5 years' preparation of the Sons or priests of Aesculapius involved, before initiation into the mysteries of the profession, a careful study of, and illumination in, the general or accessory sciences, as far as they were then known. The very word, physic, like physics and physiology, is derived from φυσις, nature. That, in many quarters, medicine has been, and, in some is yet, allowed to fall out of its legitimate relations with all other kinds of natural knowledge, is to be ascribed to the same causes as those which left the Colleges and Universities of Europe for a long time so far behind the general progress of mankind, buried in their classical learning, as to require, in our day, a vigorous, & yet incompleted, effort of reform.

The idea that those relations are positive and important is a true one. For, is not medicine a science? Every advanced art is a body, of which science is the soul. And medicine is not either a metaphysical or a mathematical science; therefore certainly one of the natural or physical sciences. Moreover, as time goes on, this truth becomes more and more of moment. The need of the scientific spirit, mind and method, grows more and more imperious to the physician, because of the extension of the materials and processes of his own art, — and, also, because the general diffusion of scientific knowledge makes it impossible for him, without it, to keep upon the level of the minds of those about him. It is altogether a mistaken notion, therefore, that a physician can do in our times, and in this country, with a mere routine knowledge of drugs and symptoms, without a cultivated intelligence. What he needs, as much as any one for any vocation whatever, is, first of all, the training and development of all his faculties; and, among them, especially those of observation and judgment.

Of the physicians of all time, who have been the greatest, and most celebrated? Assuredly those who have been the most scientific. This applies to those who were expressly practical; as Hippocrates, Galen, Sydenham. But it is even more remarkable in those who were the magnates of discovery, as Harvey, Jenner, Laennec.

So admirable is the example furnished by one of these, Jenner, of the combination of the scientific spirit with the practical mind of the ~~practitioner of medicine and surgery~~ physician and surgeon, that I propose to ask your attention for a short time to the prominent incidents of his career. This is the more apropos, because that which made him stand highest in public favor and enduring renown, the discovery of vaccination, is immediately related to a subject which will be before us in our coming lectures, that of public hygiene; and, moreover, because a more than ordinarily injurious effort of medical scepticism has, latterly, threatened to unsettle the confidence of the community, and, if possible,

of the profession, in its value.

Dr Edward Jenner, it may interest some of you to be reminded, was a country surgeon and physician. The son of a clergyman of good family, in Gloucestershire, born in 1749. He was well taught in the country, until old enough for surgical and medical study. This study was first conducted by an eminent surgeon near Bristol; and then concluded by a two years' residence in London, as a favorite pupil of John Hunter. Jenner had early shown a strong taste for the knowledge of nature; but this was fostered, directed and trained, in an eminent degree, by the influence of Hunter's master mind. If this great surgeon, physiologist and naturalist had left no original works of his own, we might almost say that the world owes him Jenner; as it is very doubtful whether the difficult problem of vaccine inoculation would ever have been wrought out, through all its obstructions,

to its glorious end, but for the rigorous culture, and at the same time severe discipline, of the investigating faculties, which Hunters precept, example, companionship and life-long correspondence gave him. While in London, a new impulse to his love of natural history came, through the opportunity to arrange and prepare the valuable specimens collected in Capt. Cook's first voyage of discovery, by Sir Joseph Banks. Jenner was an admirable dissector of delicate structures; as was shown by a preparation of his, long preserved, perhaps yet in existence, representing the progress of the ovum of the chicken, from its first germination to the end of incubation; every part being shown with the most perfect skill.

Returning from London, he began the active practice of his profession; and soon acquired a very good, but not too engrossing a business. He found leisure, in his daily rides over the country, which, in the beautiful valley of Gloucester abounded

with life of every kind, to pursue his studies in natural history. He was, also, highly social; a member of two medical and medico-convivial societies, a ready and graceful poet, and a skilful musician. Some of his epigrams would have done credit to Pope or Swift; and his piece on the "Signs of Rain" is often cited yet, in agricultural papers and almanacs, as containing, in poetical form, a more terse and vivid description of the results of close observation in the country than anything written since Virgil's Georgics. John Hunter kept him engaged in sending him specimens of all sorts, alive and dead, for his experiments in London. Their letters are full of little but hedgehogs, cuckoos, bats, toads, salmons, porpoises and eels. Hunter tried to persuade him to join himself in establishing a school of natural history and human & comparative anatomy in London; but Jenner was not then to be tempted from the country.

The most remarkable contribution made by him to natural science was his observation and description of the peculiar and previously not understood habits

of the cuckoo. The female of the European species of this bird, unlike our own, is an ornithological filibuster or usurper and destructive tyrant. It makes, unless in rare exceptions, no nest of its own; but deposits its eggs in other bird's nests, — as that of the hedge-sparrow, or the fauvette. What is more strange is, that the parent-bird, whose nest is thus intruded upon, takes good-care of the foreign egg, and, when it is hatched, of the young cuckoo. But, with a seemingly unnatural ingratitude, this young bird, growing faster than the native birds of the nest, and being stronger, ejects the latter altogether, and retains possession. The paper in which Dr Jenner, for the first time, gave full account of these facts, was presented through John Hunter to the Royal Society, and, in their Transactions, attracted much attention.

But this was not by any means his only inquiry into such subjects. He experimented, under Hunter's suggestions, into the hybernation and reproduction of various animals; noticed much concerning the annual migrations of birds; and became well acquainted with the geological relations of the rocks and fossils of his neighborhood. Besides all

this, his studies in morbid anatomy and pathology alone might have furnished reputation enough for an ordinary man. He was the first to point out ossification or other degenerative disease of the coronary arteries as occurring in connection with angina pectoris. He observed, also, in one case, in 1778, in consultation with another practitioner, an appearance which, being described as a firm fleshy tube, within the coronary artery but having no connection with its walls, — we should now regard as an instance of embolism. To one of the medical societies to which he belonged he communicated a paper, afterwards lost without publication, containing observations upon "a disease of the heart which frequently comes on during attacks of acute rheumatism, and leads to enlargement and disorganization of the part." In spite of claims of priority made on the part of others, it is probable that he was at least among the very first thus distinctly to recognize the characters of rheumatic endo- & peri-carditis. We may remember that Jenner was a contemporary of Corvisart and Laennec; — the immortal treatise of

the latter having been published in 1819. Jenner died in 1823.

He was associated with Hunter, in investigating the nature and history of hydatids, in other animals as well as in man. By his labors in connection with the study especially of tubercular and other degenerative formations and affections, Jenner contributed toward the gradual rectification, not completed until within the last half or quarter of a century, of that once prevalent error, that all diseases, local at least if not general, are but modifications or degrees of inflammation. But all these were only ~~subsidiary~~ or preparatory inquiries in comparison with the ~~one~~ great achievement of his life, the introduction of the practice of vaccination. To this, even though the history of it may be familiar to you all, I desire to invite a few moments of attention.

When Jenner was quite a youth, he was struck with an occurrence in his ~~preceptors~~ private office. A young country-woman, conversing about

small-pox, said, - "I cannot take that disease, for I have had cow-pox." It seems, from other evidence, that such an opinion prevailed among the dairies of Gloucestershire! On a tomb-stone at Yet-minster, an inscription asserts that Benjamin Jesty, a farmer, in 1774 (some say 1770) inoculated his wife and children with the cow pox, to prevent their getting small-pox. The same thing was related, after Jenner's introduction of vaccination, of a Mrs Rendall; although without much proof. When the Duchess of Cleveland was taunted by her companions, Moll Davis (Lady Mary Davis) and others, that she might soon have to deplore the loss of that beauty which was her boast, the small-pox then raging in London, she is said to have replied that she had no fear of it, for she had had a disorder which would prevent her from ever having the small-pox. But all such knowledge was, with those who had it, practically unproductive, until Jenner took it up, with the intuition of genius and the mastery and patience of the scientific mind. When he went to London, in 1770, he talked about it to Hunter and others. After his return and engagement in

practice, he urged inquiry concerning it upon his medical friends. So persistent was he in this, and yet, with them, so fruitlessly that one of the Medical Societies to which he belonged threatened to expel him if he continued to harass them with so unprofitable a subject. Beginning, however, his own observations and inquiries in 1775, by 1780 he was able to perceive the dawn of the future greatness of his achievements. His first experiment was with Variolous inoculation upon his own eldest son. Variolous inoculation subsequently took no effect upon him; confirming Jenner's opinion that this, as well as cow-pox, was identical in nature with small-pox. For other experiments of various kinds, and close, exhaustive study of the whole subject, a number of years were yet required. In the first place, he found that what was commonly called cow-pox did not always prevent small-pox. Instead of being discouraged by this, he went on to ascertain, by patient scrutiny, that cows are subject to a variety of spontaneous eruptions about the udder; that they all

are capable of communicating sores to the hands of the milkers; and that whatever sore was so produced was called, in the dairies, cowpox. He had to designate, therefore, a spurious and valueless, as well as a true, protective cowpox. The latter he believed to be identical with the smallpox of the human subject, and also with the grease of the heels of the horse. This last opinion, which has not been largely insisted upon by other writers, was confirmed by unquestionable facts, made known especially by Loy of Yorkshire, and Viborg of Denmark. Sacco of Milan, It is probable, however, that in the horse as well as in the cow, there is more than one disease going by the same name. Dr Valentin, of France, is asserted to have proved that the ass, sheep and goat are all susceptible of vaccine inoculation. Next, however, Dr Jenner found that, sometimes, the genuine cowpox could not be depended upon. Here was a difficulty that would have disheartened most men. But, with that faith in an ascertained principle which is an essential element of the truly scientific mind, this, also, only led him to repeat, vary, and closely analyze his observations. Thus he found, finally, that it is only in a certain state of

the virus that it is capable of affording protection from variola; while, even when not possessed of this power, it may produce a local affection of a somewhat peculiar and yet spurious kind.

For actual, satisfactory trial with it upon a human subject, he had yet to wait a good while. Meantime, he conversed and corresponded largely with distinguished medical men, in London and elsewhere; Sir Everard Home, Cline, Haygarth and others took more or less interest in the matter, but no one shared his enthusiasm, or, with any confidence, his hopes.

On May 14th, 1796, however, a day celebrated by a publicly distributed medal in one of the great capitals of Europe, Berlin, his crucial experiment was performed. He inoculated a boy of eight years of age with cowpock matter. The eruption followed, with the characters which he now so well knew. Then came the critical test, of subsequent small-pox inoculation. This, too was done; and a perfect

immunity was demonstrated. Were Jenner's labors now at an end? Might he not now rest and wait for a glorious reputation to come to him? On the contrary, – in the letter in which he announced the full success of his first vaccination to his most intimate friend, he concludes with the words, "I shall now pursue my experiments with redoubled ardour." Indeed, by far the hardest part of his task was yet left; – to convince the world of the value of his discovery.

One might have thought, that to make it known and appreciated by the members of his own profession, would not be very difficult. Even there, however, obstacles met him. His great work, the "Inquiry", was published in 1798. It contained an account of 23 cases of the vaccine affection, 16 of them taken by contact with the cow, and the rest by inoculation with the matter. Going to London in the year of this issue

he was disappointed and mortified that, during a stay in the city of 3 months, he was unable to find a single individual willing to allow himself to be vaccinated so as to exhibit the disease for the instruction of the profession. Some virus which he took to London with him was, nevertheless, consigned to Mr Cline, who inoculated with it a child suffering with hip-dis-ease; thinking that it might be remedial. An eruption followed, and the child was afterwards in-oculated with small pox matter without effect. But Mr Cline did not succeed in using the same virus with other patients; and Jenner was at that time unable to procure fresh matter in the country near him. At one period of his investigations the cow-pox seemed to disappear entirely from Gloucestershire; while in Cheshire, also a dairy county, it was not known; though discovered a little later in 18 of the counties of England, as well as in many other countries of both hemis-pheres.

It may interest those, if there be such, to whom the subject in its historical aspect is comparatively new, for me to say, that inoculation with smallpox

matter for the benefit of the individual of greater mildness in the attack than when taken in the usual way, was first advocated in England by Timoni of Constantinople, in 1714, and in Venice by Pylarini; but was fairly introduced from the East by Lady Mary Wortley Montague, in 1718. That the total amount and consequent mortality of small pox was increased by the practice of inoculation, the disease when so produced being as contagious as when spontaneous, seems to be beyond doubt. Without James's discovery to replace it, it is probable that inoculation would have been given up. Of those actually inoculated, about 1 in 300 died. From natural small-pox, from 1 in 2 or 3, to 1 in 7 or 8; and nearly all who survived were disfigured, often horribly, by the effects of the eruption. So great were the fluctuations of opinion concerning inoculation, that while in 1754 the London College of Physicians declared the fullest approbation of it, in 1763 it was prohibited in France by Royal authority.

We have seen that Jenner's first successful vaccination from one human being to another was performed in 1796. Through Dr Waterhouse of Cambridge, Massachusetts, it was introduced into America in 1799; by De Carro of Vienna, into Austria, in the same year; into France and Spain, in 1800; Italy, Russia, Denmark and Sweden, in 1801; India, returning to the East with more than usurious interest the gift of inoculation, in 1802.

In the United States, President Thomas Jefferson took a strong interest in the promulgation of vaccination; so did John Adams and John Quincy Adams and other leading men. But the profession was not altogether prompt in adopting it. In 1801, Dr Waterhouse wrote that he had given the virus in vain to most of the principal physicians of Boston and its vicinity; and that not a single case of vaccination had yet occurred in Philadelphia. In our city, he was told that "the leading physician", whose name is not

given, "~~thought~~ it too beastly and indelicate for polished society!" In the very next year, however, we are told ~~that~~ Dr Rush of this city had come out full and strong in praise of the practice, and had published an eloquent lecture upon its discovery.

Honors and attentions now began to pour in upon him. He was besieged with correspondence, and made member or associate of nearly all the learned Societies of Europe, and of the American Academy of Arts and Sciences.

~~[illegible]~~

The Empress dowager of Russia sent him an autograph letter and a diamond ring. In 1802, after a scrupulously careful inquiry into the merits of the case, Parliament voted him an honorarium of £10,000; which many ~~thought~~ to be much too small a sum; as he had given up practice and spent a great deal in establishing vaccination. Later, an additional grant of £20,000 was accorded. In the same year, 1802, the Royal Jennerian Institution was founded, with the King and Queen of England as patron and patroness,

the Prince of Wales and 3 Royal Dukes vice-patrons, and the Duke of Bedford President; with any number of noblemen as vice presidents. The Spanish Government fitted out an expedition to convey vaccination to all the distant colonial possessions of Spain.* But it was by no means all smooth sailing yet with Jenner. He had bitter open enemies, and treacherous friends. Some of the former denounced the new practice, as tending to convert human beings into beasts. Inoculation had already been condemned publicly by one of the clergy, as no new art, because Job had been inoculated by the Devil. Ehrmann of Frankfort went farther, and tried to prove by the Scriptures and the fathers of the Church, that vaccine was nothing less than Antichrist. More plausible than these were the efforts of those who endeavored to deprive Jenner of his fair credit by asserting other previous discoveries of vaccination. Such were named as existing both in

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* It had on board, under charge of Dr Balmis, Surgeon extraordinary to the King, 22 children, who had never had small-pox, selected for the preservation of the vaccine fluid, by transmitting it from one to another during the voyage.

England and France, — and an interpolation (Pearson) (Rabaut of Montpélier) was actually made in a copy of an old Brahminical writings, to make it appear that the practice had been from in ancient India!

But, some of the seeming friends of vaccination gave Jenner rather the greatest trouble. They adopted it without taking pains to inform themselves of all the facts and precautions essential to it. Matter was sent out, in large amounts, by two well known physicians, from the Small-pox hospital of London, — in which actually the virus of varila was mingled with, and sometimes substituted for, that of the vaccine affection. It was no wonder that one medical man wrote to Jenner that his patients got the vaccinia in the confluent way! It required incessant attention, and vast patience and labor, from Dr Jenner, to prevent such fearful practical mistakes from ruining the credit of his discovery at the very start. Never did any fact

asserted in inductive science pass through a more searching ordeal of inquisition, in every way, than this.

And are we to be told, to-day, that it is all a delusion? Have Jenner's labors, and his wonderful genius, existed, after all, but in vain? Two medical men in New York, one of them a surgeon of considerable reputation, (in 1869) ~~(last year)~~ addressed a letter to the Board of Health, protesting against compulsory vaccination. And a magazine of a popular character, called Good Health, contributed to by a number of respectable physicians of this country, contained, (in 1869 or '70 some months since), an article by Dr Both, of Boston, in which it is said that all the scientific men of Europe are now opposed to vaccination; and that the diminution of small-pox, which is admitted, must be ascribed to a spontaneous change in the human constitution and better observance of the laws of health! An anti-Vaccination League has been started in England, including, I believe, some members of the medical profession.

I must not, (gentlemen), in this (introductory) Lecture, detain you with the Discussion of the whole question, important as it is. Let me just say that I believe these last assertions to be altogether untrue. The ablest scientific men of the Medical Profession, who alone are competent to judge, both in Europe and America, retain their confidence in the value of vaccination. Dr Lomes of New York, a man of the largest experience bearing upon the subject, a first class authority upon it, has abundantly shown, that vaccination from arm to arm, according to Jenner's rules, best done with 8th day lymph, is as reliable an attack of Smallpox itself to give immunity from that disease; that the danger of syphilitic inoculation in this way is absolutely null, with that care which every respectable physician may and always does take; and that to substitute bovine vaccination, directly from the cow, as a general rule, for

the use of the virus taken from healthy human subjects, is to substitute uncertainty for certainty, without any corresponding advantage; however suitable it may be, now and then, to introduce good fresh cowpox matter into use for renewal of its strength. I believe that, with proper care and skill, it may pass through many human systems without any loss whatever of its prophylactic power; and that, with revaccination to secure its full effects, we might trample out small-pox, everywhere, if only we could vaccinate every child that is born into the world.

Pardon me for troubling you here with a very few figures; some of which have been lost sight of, as they are as old as the time of Jenner. Before that period, it was estimated that 1 in 14 of all born in Europe died of the small pox. In Russia, the imperial physician stated that every 7th child born died of that

2 millions have been destroyed by it, in the Russian empire, in a single year.

Disease. In Great Britain and Ireland, 45000 annually was its mortality; in all Europe, 210,000 was an average number for a year; in the world altogether, about 600,000. Now, what did vaccination do? Let us take a few examples.

Vienna and Milan formerly had even more deaths from smallpox than London. But, in 1812, about 10 years after vaccination had been introduced upon the Continent, it was officially reported that Vienna had been free from the pest for 5 years, and Milan for 8 years. So far as this exemption may have been less complete since, it is doubtless owing, there as elsewhere, not to the failure of vaccination to protect, but to its failing, through neglect, to be performed. In Ceylon, where once the very appearance of small pox caused whole villages to be abandoned, from 1802 vigilant superintendence secured through vaccination, and by 1808 variola was entirely extirpated from the island. So it was with Sweden and Denmark; which became freed from it, and

continued so for nearly 20 years. Now absurd it is to talk of this being due to a change in the human constitution, or to better knowledge of the laws of health, is shown by the constant return of the same scourge, wherever vaccination is neglected; by the wide destructiveness of cholera in the same localities over and over again since 1832; and by the destruction, in 1870 ~~within this very year~~, of the Indians of Montana in our West by smallpox, 500 out of a thousand in a few months. Whole tribes of savages have thus been swept from the face of the earth by smallpox. The French Minister of the Interior, in 1811, gave it as his opinion that vaccination had already been shown to save 150,000 lives annually to the empire. Take, again, on a smaller scale, the instances of particular institutions. The British Royal Military Asylum for the children of soldiers, containing more than 1100 children, with enforced vaccination, last, from 1803 to 1811, only one child from smallpox, — this

One having escaped being vaccinated by mistaken information, causing it to be supposed that it had been done. So, also, it was with the London Foundling Hospital, the Polytechnic School and the different Colleges of Paris, and like institutions. It is very satisfactory to confirm these by much more recent evidences of a similar kind. In a book published in 1869 ~~last year~~, Dr Cameron, Health Officer of the City of Dublin, states that, while Ireland had formerly lost nearly 6000 lives in ten years by small pox, in 1868 there was not a single case in the island. Dr Austie, in the London Practitioner, within a few months of the date of the same publication, mentioned nearly the same state of things as existing in Scotland, — and all from thorough vaccination. Neither of those countries, and especially not Ireland, can possibly be supposed to owe such an immunity to favorable circumstances among the population, or to special observance of the laws of health.

Of Vaccinations in the Wurtemberg army, over 14 thousand men —

For each 1000 —

Perfect success —	340
Moderate success —	260
No success —	400

In five years after, though exposed to 5 different importations of small pox, among all these soldiers there occurred but <u>one</u> case of varioloid.

May not so-called "unsuccessful" vaccinations still affect the system? I think so. (R. Taylor's case) 9 failures, — yet varioloid afterwards

1. History of Vaccination
2. What is Vacc.?
3. Theory of its action.
4. The operation.
5. Cowpox Vaccine.
6. Bovine vacc.
   1. Original
   2. retrovacc.
   3. variolous
7. Vaccinal syphilis, &c.
8. Revaccination.

I have carried you, thus, gentlemen, over a somewhat long, and it may be, wearisome account of a very familiar character and discovery: why was it? It was my wish to illustrate, by this great example, what science, what the trained, cautious, observant, experimental and reflective scientific mind, may do for Medicine. Has everything been now done that may ever be accomplished? Are there to be no more discoveries, no more triumphs? I do not believe it. Medicine abounds in problems, as truly as California does in rocks and sands of gold. What is wanting is, the fitted minds and hands for working in those mines; the metal is there, surely, to reward the worker. And again I urge, that the kind of training most useful, in preparation not only for medical discovery, but for medical thought, observation and practice, is the naturalistic training. Have we not abundant illus-

-trations, in medical and scientific biography and history, of the closely kindred nature of these two pursuits, of medicine and natural science? Not to speak again of John Hunter, or of Larrey of France, surgeon and ~~[illegible]~~ naturalist, here in Philadelphia none should ever forget Godman, the naturalist-physician, — nor Samuel George Morton, whose superiors in either department of science or practice, men hardly to be found at home or abroad. Science has even owed some of its own most beautiful discoveries to physicians. Who ~~[illegible]~~ first distinctly announced the now universally ~~[illegible]~~ accepted doctrine of the sexes of flowering plants? It was Camerarius, a physician of Tübingen in ~~[illegible]~~ Württemberg. Who, before either Hales, himself a physician, or De Candolle, made clear the fact of the circulation of the sap in plants? Claude Perrault, physician, architect and naturalist. So, also, the truly animal nature of the coral-builders was first made out by Peyssonnel, a ~~[illegible]~~ physician, against the ~~[illegible]~~ contradiction of the French Acad-

-eny, and, more than all, of Bernard de Jussieu, who maintained that they were plants.

Perhaps it may be asked, then, what is our ideal of the right kind of training and preparation for a really educated physician. Ought we, in this late day, to demand a standard lower than that of Hippocrates? If five years were not too much then, can less be entirely enough now? But it is not a question merely of time, or of quantity; it cannot be so measured. Admitting also that some things very desirable are not altogether possible; still, it is well and useful to know what is most desirable. Under this view, it may be now said, that a course of study preparatory for medical scholarship and professional practice ought to be progressive. It should have, at its foundation, a broad and strong basement of natural knowledge. In this ought to be included the elements at least of physics and mechanics and general chemistry. On these should be built

Mineralogy, botany, and comparative anatomy. The claims of these branches have been and are so amply and ably illustrated here by my colleagues ~~that~~ it is not required for me to dwell upon them. Incidentally it may be mentioned ~~that~~, in the University of Edinburgh and in those of Germany, a thesis on a subject connected with Comparative Anatomy is now accepted for a medical degree. Next to these studies, in a progressive order, must come those with which some, ~~perhaps~~ we may have to say many, medical students begin; Human Anatomy, and Human and Comparative Physiology. These must follow General Pathology, Therapeutics, and Materia Medica; & Personal and Public Hygiene. Upon such a structure, when well laid and strongly ~~thought~~ compactly built, may be superimposed all the so-called practical branches; Practice of Medicine, didactic and clinical; Principles and Practice of Surgery; and the

Science and Art of Obstetrics. But no plan of study for the physician can yet be complete, without the extremely important addition of the Principles of Medical Jurisprudence and Toxicology. And the medical man is not wise, who now-a-days fails to acquaint himself, practically as well as by books and lectures, with all the modern instrumentalities, employed for diagnosis, and for minor medicine & surgery; chemical analysis, the microscope, laryngoscope, ophthalmoscope, the sphygmograph, thermometry, the atomizer, and the rest. For the science and art of medicine and surgery, like the other sciences and arts of our age, are now ~~[illegible]~~ industriously inventing; and their inventions must be learned and utilized. I am not ready to admit that, as a very distinguished professor in another institution is quoted as recently saying, ~~[illegible]~~ the course of medical instruction in this city has not advanced an inch in the last half century. My recollec-

-tion of it goes back but 30 years. But I think too highly of the progressiveness of that learned gentleman's own mind; too much of the ability and sagacity of those of his school; and we know too much of the extension of the teachings of and around this University, in much less than 50 years, to allow for a moment that such an allegation is correct. I have said that, around as well as in it, there has been and is continuous progress; for I trust that all committed with authority in this institution may be ever ready to give cordial welcome and do full honor to the noble and laborious corps of private and associated teachers who surround this maternal centre, and who contribute so essentially to the success of medical instruction here.

Now, gentlemen, in what has just been said of a course of full medical study, a large prospect has been opened. Who is sufficient for it all? No 3 years' course can accomplish it. What then? I can but add my feeble voice to the

general demand, growing increasingly loud every year, for a voluntary extension of the time, by agreement between the students and the Colleges. And a very important facilitation of the full preparation required to, I believe it will be, to adopt a really progressive plan, such as is advocated by Dr Parkes, Professor of Hygiene in the Army Medical School at Netley, England. By this, the hard work of the course is broken in two, by a system of successive examinations. At the end of the first two of the 4 years prescribed, the student may be examined upon the more fundamental or primary branches, as anat-omy, physiology, chemistry & perhaps Materia Medica. Getting then his certificate of proficiency upon these, he may devote the greater part of his attention in the following two years to the full study of the more practical branches,

It seems to me obvious that such a plan must render the whole work lighter, as well as more satisfactory.

Of course it is yet true, that no man can learn everything; and, also, that no scientific drilling can, alone, make a good physician. This requires more and other than that. It must be in the man. As Jenner himself said, — "neither books, lectures, nor the longest experience are sufficient to store his mind with the indescribable something a man of our profession should possess." In this he only followed Bacon, on the subject of General Science: "nec manus nuda nec intellectus sibi permissus multum valet;" neither the unaided hand nor the intellect acting alone, can accomplish much. I have, then, placed before your minds a high standard; but, whether attainable or not, must not something like it be our aim? It does

not appear to me to be now altogether a matter of choice, but of necessity. The times demand it; self interest requires it; the self protection of the profession makes it imperative. What is the position of the profession of Medicine now? There is no more magic in it — no more superstition, as of the Egyptian priest, or the medicine-man of the Indian wigwam, — not even the despotic authority of the physician of the last century. The mystery of Medicine has gone; what is there left? Science, only; when not that, — nothing. We must stand and rise by our intellectual superiority and resources; only by these. As some one has said, the fact that physicians come all the time in contact with the bodies of men, women and children, confers a ~~[illegible]~~ semi-manial association upon their work; — somewhat more elevated only, in itself, than that of the barber, ~~[illegible]~~ the shoemaker or the tailor. The difference must be, really intellectual; — the dignity of the vocation arises from its Science, as well

as for the importance of the issues of life and death with which it is concerned. Dr Rush observed, that, without science, ours is ever a very humble and degrading art. But how familiar is the remark, that the true place and dignity of the medical calling, as it is, are under-rated! In all countries this is so; in aristocratic societies abroad, and in official rank and position. Within the last year, we have had knowledge of this, in an insult to the whole profession, in the person of a medical officer of the navy; against which, no matter how remote from connection with naval and military affairs, I would have a protest go up from every medical school, medical society, and medical man; until the voice of remonstrance should compel itself to be heard. And, with this we find, that in the actions of the present United States congress, the tendency, instead of being towards an elevation of the rank of medical offices under government appointment, is towards its farther subordination. May it not then be said, that the profession must grow more and more intellectual, more dis-

ciplined, more scientific, to oblige that recognition to be accorded which does not come of itself? And, an added reason for this is, the occasion for self-defence against charlatanism;—in individuals and in systems. Or is hardly enough, now, to be called doctor. Doctor of what? From whence? The time may not be far off, when, after the degree of M.D., it may become desirable, and customary, to add the name of the institution by which it was conferred. When that time does come, we may ~~hope and~~ trust that the institution within whose walls I now have the honor to address you, may be very far from last or least in the grade of value of its honors. Every one who enters the profession of medicine, in whichever of its departments he may choose or find the sphere of his labors, is bound to do what he can, to uphold its dignity, and to advance its usefulness. At every stage, no matter how early, of his studies, this view should be held before the mind.

Let me, then, conclude to-day, with some of the words of one of the most original scientific minds in the profession of our age;— Rudolf Virchow; addressed by him, to a recent congress of Naturalists and Physicians, in Germany. "We, physicians, have been in all times the apostles of peace and conciliation; on the field of battle, the surgeon performs his serious duties towards all, without distinction of persons. But, we manifest ourselves also in the combats of intelligence; and this elevated mission, incumbent upon us to-day, to cause our voice to be heard in discussions upon public interests,—not in giving our aid to the frivolous combinations of diplomacy, but in teaching statesmen how they may confer upon the people happiness and health,— this task I dare to hope we shall fulfil with indefatigable zeal; and that every occasion of our reunion may be one of newly recorded triumphs."x

x et que chaque fois que nous nous réunirons désormais, ce sera pour enregistrer de nouveaux triomphes.
"Qu'est que la maladie" 2d Congress of German Naturalists & Physicians Konstanz 1869. Rev. des C. Sci. 1870.